It is possible that some of these species, e.g., Gull-billed Tern and Marsh Tern, were brought into this region by the activity of two tropical cyclones off the north-west coast in March, 1960.

Tree-nesting aquatic birds, such as those recorded in 1961, apparently breed after flooding of the large rivers. Under these conditions large pools along the rivers usually persist for some considerable time and these form focal points for feeding and consequently breeding purposes. These pools are in most cases fringed with tall river gums *(Eucalyptus camaldulensis)* in which nests can be suitably built.

Nesting has been observed to take place both in the late summer and autumn and in the spring. Unfortunately I was not able to get into the field in the intervening months to find out whether winter conditions (including low temperatures) inhibited or retarded breeding, as appears to be the case with land birds (cf. Serventy and Marshall, 1957: 118).

ACKNOWLEDGMENTS

I wish to extend my thanks to Mr. G. A. Lodge for informing me of the location of the nesting colony of Gull-billed Terns at Wagga Wagga Station. I am also grateful to Messrs. A. Bain, W. Broad, R. Forrester and W. Lacy for allowing me to visit various localities on their stations. During the course of my field trips I was accompanied by Messrs. I. C. Carnaby and J. B. Woods to whom I am indebted for their assistance.

To Mr. J. R. Ford I am very thankful for assistance with the preparation of this paper.

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LIGHT TRAP CATCHES OF TWO SPECIES OF RICE STEM BORER MOTHS NEAR WYNDHAM

By L. E. KOCH, W.A. Museum, Perth.

Information about the abundance of insects in the Kimberley area is unfortunately very meagre. Two of the few insects studied there in any detail have been the rice stem borer moths, *Tryporyza innotata* (Walker) and *Niphadoses palleucus* Common. These belong to the subfamily Schoenobiinae (Lepidoptera : Pyralidae).

These moths occurred among the experimental crops of cultivated rice that were grown at the Kimberley Research Station in the Ord River district, near Wyndham. The caterpillars caused

severe damage to the rice by feeding within the stems. The writer (Koch, *J. Dept. Agric. W. Aust.*, (4) 1 (12), 1960: 1061-1063) has discussed the general biology of these insects.

Rice was first planted at the Station in 1947. Mild infestations of the stem borers were then noted until 1952, when they were numerous. They caused serious damage in the 1953-54 season. Maximum numbers of moths were present in the 1956-57 season when the severest known infestation occurred.

The writer was at the Station during part of the season of greatest moth abundance, and kept a record of the rice stem borer moths caught daily in a light trap set among the rice plots.

The light trap was arranged 3 ft. above ground level, and was set from twilight until 10.30 p.m. Its light source was a 160 watt globe run off the power supply to the Station.

The total numbers of moths of both species built up to a peak early in March (Fig. 1). The trap was not set after April 8 that year, but general observations showed that the numbers of moths decreased rapidly after that date. During the 1956-57 season, it was discovered that two species of moths were involved, and these were separated after February 20 (Fig. 2).

The moth stage of the rice stem borers are usually noticeable in the field only during the wet season, November to April. Observations made on the biology of these insects indicated that four generations occurred during the 1956-57 season. The immature insects

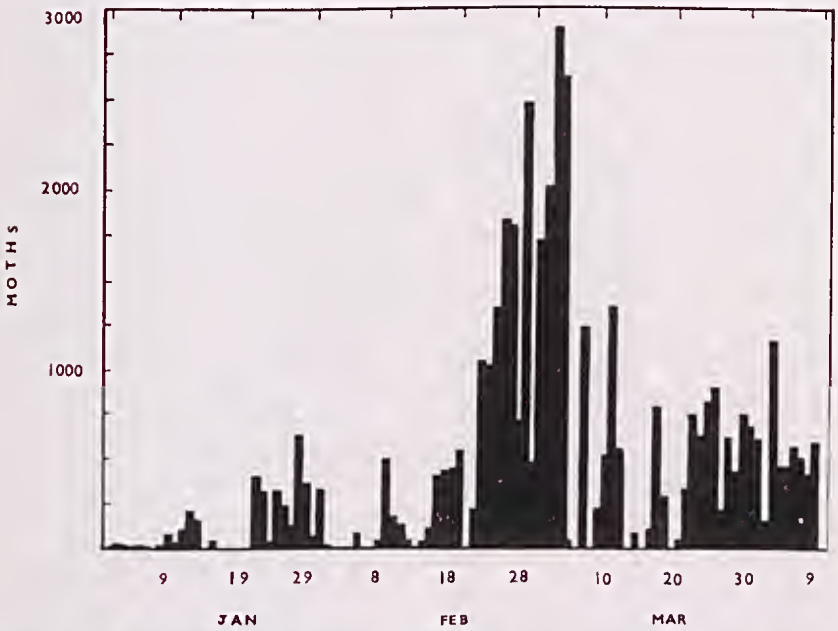

Fig. 1.—Total daily light trap catches of two species of rice stem borer moths in 1957. Zero catches indicate nights when the trap was not set.

that hatched from the eggs laid by the last generation of moths for the season remained as pre-pupae until the next wet season, which commenced in November 1958. Then they pupated and the moths of the first generation of the next season emerged. The bottom graph in Fig. 2 shows three of the four peaks of moth abundance. The first peak for the season occurred before the period shown on the graph. Fig. 1 illustrates that during January, February and March in 1957 over 38,000 moths were caught; and that the largest catch for a single night was over 2,800.

There was some controversy, at the time, whether light traps, set during the time of moth activity, could be of any use in reducing the numbers of these insects by trapping gravid females before they could lay their eggs. Therefore a count was made of the gravid females in each catch. The proportion of gravid females in the catches (Fig. 3) when considered in relation to the total moths caught (Fig. 2) indicate that large numbers of female moths were trapped before they could lay their eggs.

After 1957, repeated treatments with insecticides, such as endrin, have helped to keep the numbers of the rice stem borer moths at a low level.

The writer wishes to thank Mr. A. L. Chapman and Mr. E. C. B. Langfield, who were both C.S.I.R.O. Technical Officers at the Kimberley Research Station at the time, for assistance in operating the light trap and in sorting the catches.

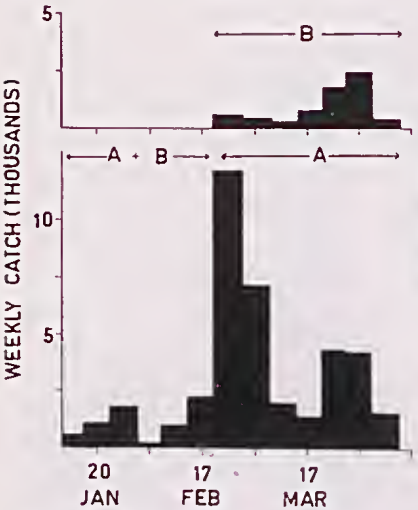

Fig. 2.—Weekly light trap catches of rice stem borer moths in 1957. A, *Tryporyza innotata;* B, *Niphadoses palleucus;* A & B, both species together.

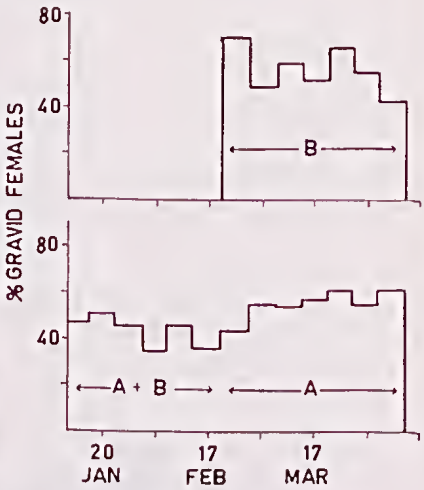

Fig. 3.—Weekly percentages of gravid females of rice stem borer moths in the weekly light trap catches in 1957. A, *Tryporyza innotata;* B, *Niphadoses palleucus;* A & B, both species together.